Ep. 89: Dr. Thomas Seyfried | Cancer as a Metabolic Disease & the Role of Nutrition in Healing- Transcript

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Podcast Introduction and Guest Overview

What if optimizing your metabolism was the key to unlocking your best life? Welcome to the Life Possible podcast, where we bring you cutting edge insights, real life transformations, and powerful strategies to help you win the fight against obesity and metabolic disease.

Join host Dr. John Barnes as he explores the science and stories of transformational metabolic health, because when you fuel your body right, you unlock your greatest potential.

From leading experts in nutrition and wellness to inspiring success stories, this is your go-to resource for education, motivation, and empowerment on your journey to a healthier, more vibrant life.

Your best life isn't just possible, it's within reach. Let's make it happen together. Here's your host, Dr. John Barnes. Hey, welcome to another episode of the Life Possible podcast, where we explore what's truly possible when you take control of your health and your future through the power of metabolic science and nutrition.

I'm your host, Dr. John Barnes, and today I have the distinct honor of interviewing one of the most influential researchers in the field of metabolic health and very specifically cancer, Professor Thomas Seyfried.

Dr. Siefried is a professor of biology at Boston College and the author of a groundbreaking book, Cancer as a Metabolic Disease. His work has shifted the science landscape by challenging the idea that chronic diseases, but most especially cancer, are purely genetic.

In addition to his book, he has over 150 publications to his credit. Dr. Seyfried has taken the work of Dr. Otto Warburg, who won the 1931 Nobel Prize when originally proposed this metabolic theory of cancer.

Dr. Seyfried has expounded upon this, answered some questions that were left unanswered, and has presented the scientific community with a much clearer and more complete case as to why cancer should be considered and treated as a metabolic disease instead of one purely of genetic mutation.

How Seyfried Entered Cancer Metabolism Research

I know that so many of you, both personally and someone you love, has been impacted by cancer or will be impacted by cancer. And if you're a healthcare practitioner who is looking for more effective tools for your patients, this show is going to be a must-watch episode.

So without further ado, let's bring in Dr. Seyfried. Hey, Doc, how are you? I'm doing very well. Thank you, John. It's nice to be here. Oh, I'm so happy to have you so honored to have you on our show.

And like I said, we were introduced by email by Martin Gillespie, a cancer survivor himself, who I also had on my show a few episodes ago. So I was very grateful for that.

And and so yeah, I just I just wanted to find out, how did you actually get started down this pathway studying cancer as a metabolic disease? Well, I started in this whole thing because I have a degree in genetics and biochemistry from the University of Illinois, master's degree in genetics from Illinois State University.

And I did a lot of work in biochemistry related to epilepsy at Yale University, where I was a postdoc and then a faculty member. So we were always putzing around with different things.

But my linkage to cancer was through basically glycolipid biochemistry, having no relationship to any kind of metabolic therapy or any kind of way to manage it.

It was predominantly what we what we call discovery research. We just analyze the patterns of glycolipids in tumors compared to normal tissue and try to figure out what's going on.

So it's a comparative analysis. And of course, we were interested in the structure and function of various glycolipids, which are lipids with carbohydrate They're involved in adhesion and movement, that kind of thing.

But it was just like, wow, look at all the abnormalities that cancer cells have in glycolipid biology. And then people thought, well, maybe these glycolipids play a role in angiogenesis, which is the abnormal vascularization of tumors.

And we did come up with some key lipids that did reduce angiogenesis. It was quite interesting. But the issue, of course, is we were working on managing epileptic seizures in mice independently of our research on glycolipid biochemistry.

But we noticed that, Some of my students were looking more into ketogenic therapies for epilepsy, which is where it all started with Wilder in 1921 at the Mayo Clinic.

And they asked me what I thought about it. I said, well, at Yale, they didn't get excited about ketogenic. They didn't want any part of it. They thought drugs would be the best when I was there.

But my students kind of dragged me into the idea because Jim Abrams, uh who started the charlie foundation unfortunately jim passed away not that long ago uh his son charlie uh was on a death spiral with epileptic intractable epileptic seizures and uh he he said um he was just given more and more drugs until he teamed up with john freeman and and and milley at john's hopkins university where they where they had the only satellite work of ketogenic diets for epilepsy.

The predominant one was there, the late John Freeman. And Jim Abrams said, how come he had Charlie, his son, go to Johns Hopkins and get his seizures managed?

And he said, how come nobody knows about this? So he got his friend Meryl Streep, the movie actress, to do a movie called First Do No Harm to bring attention to ketogenic metabolic therapy for epilepsy.

And then we had all these epileptic mice that we were trying to manage. And then we started to put them on calorie restrictions and ketogenic diets. But at the same time, we would have all these brain tumors that go in and looking at lipid biochemistry in the brain tumors.

And if you have two parallel projects, eventually they overlap. So what happened, we realized that calorie restriction was powerfully antiangiogenic, independent of the glycolipid patterns of the cells.

So not only was it an anti-anth, it shrunk the tumors down tremendously. Just by cutting calories down, making blood sugar low and ketones elevated, these tumors were getting hammered.

Warburg, Glucose, and the Metabolic Theory of Cancer

And the blood vessels were, it was more powerful anti-angiogenic therapy than any of the multi-billion dollar drugs that they were throwing out that eventually turned out not to work.

Because in the beginning, 2000s, angiogenesis was a hot topic in cancer biology. It means the abnormal vascularization of the tumor. The late Judith Oatman came up and said, if you target the abnormal vessels, you can shrink these tumors.

And we were seeing calorie restriction, water-only fasting, and this kind of really reducing these blood vessels and shrinking the tumors. But then we realized it wasn't just that.

It was the fact that there was a strong connection between the level of blood sugar and how slow or fast the tumor would grow. So if the mice were eating a lot of food with high carbohydrates, they had a high blood sugar level.

The tumor skyrocketed. I mean, the tumors were like turbocharged. And then when you lowered the blood sugar, the abnormal vessels went away, the tumor cells started to die, and the tumor cells shrunk.

And we're saying, wow, this is really powerful stuff. But people had known that, but people knew calorie restriction could both manage and prevent cancer in mice and even in humans.

But I didn't realize it, but it was the work of Otto Warburg, who actually received the Nobel Prize for his work. He discovered the respiratory enzyme cytochrome C.

He did not get a Nobel Prize for his work on cancer, although he was nominated several times. But he found the enzyme in the mitochondria that allows cells to gain energy from oxygen.

So that was a big breakthrough. But he had studied so many cancer cells, and he said, They're all dependent on high levels of glucose because they can't use oxygen efficiently.

They can't respire. And this was his biggest finding. Well, we found what he found, and we corroborated what he found. But we extended it far beyond what he knew at that time.

There was a lot of questions. Some of the discoveries were not available to him at that time. Otto Warburg. He discovered the origin of cancer, no question about it.

He absolutely is the discoverer of how cancer starts. He just wasn't able to roll that into an effective therapeutic strategy. He did not know that the tumor cells not only ferment glucose, which is using glucose to get energy without oxygen, But he did not know that the amino acid glutamine is also a fermentable fuel, which we just recently published, the strongest evidence available in the scientific literature.

that the second fuel is glutamine fermentable. Everybody thought and still do that they think glutamine is respired, which means it's used with a functional mitochondria, but it's not.

It can be respired by normal cells, but it's fermented by tumor cells. This is a very big difference in biochemistry. So we discovered that these tumors use two fermentable fuels.

And we also cleared up a lot of mess with the oxygen consumption measurements, which people assumed was evidence for using energy through oxygen. So you measure how much oxygen a normal or a tumor cell take up, and you quantify the amount of energy produced based on the oxygen consumption.

And some tumors and normal cells take up similar amounts of oxygen, leading Warburg and others to say that some tumors can respire effectively. We clearly showed, we and others, that the oxygen consumption is not linked to energy through oxidative phosphorylation.

So it's kind of a misinformation thing. It leads people down rabbit holes and off into misinformation. So we kind of cleared up, we straightened out the path, cleared up a lot of the misinformation, and now we can move forward where Warburg actually started and where we will finish.

Because we know what causes cancer, we know what the origin is, and we know how to manage it, and we know how to prevent it. So when you put all that together, we know what to do.

The problem, of course, at the scientific biochemical level, we know pretty much what's going on. But in the practicality of rolling this into an effective therapeutic strategy, is the big roadblock.

You know what to do, but there's very few people that really want to do this or can understand what it's all about. Because right now, you're right, they think cancer is a genetic disease caused by various mutations.

And the nuclear mitochondrial transfer experiments completely destroyed that. Now we have some cancers that have no mutations. And we have all these driver gene mutations found in normal tissues that never develop cancer.

So when you put all these facts together, as I said, you have to be a hopeless ideologue to consider cancer as a genetic disease. It's not. It's a mitochondrial metabolic disease.

driven by two fuels, glucose and glutamine, and they can't switch to fatty acids or ketone bodies. So that gives you the strategy for knowing how to manage this disease.

You have to simultaneously target the two fuels driving the dysregulated growth while transitioning the body over to nutritional ketosis. And then you come in strategically with drugs that target the glutaminolysis pathway because there's no food or diet that will lower glutamine.

So when people always ask me, what do I need to eat to lower glutamine? No, you can't do that. Right, right. You need drugs. And the drugs that we are finding and others are these simple parasite medications.

And Benzol, Fenbenzol, we published a paper on that. They're targeting the same two pathways that the cancer cells need. There's some other drugs that are more powerful, but they're toxic.

And we're trying to figure out how to reduce their toxicity. So once we package this all together, there will be no reason in the world why anybody would not want to manage their cancer using metabolic therapy.

The problem is they think cancer is a genetic disease supporting a multi-billion dollar industry, which is not working. According to the recent data from the American Cancer Society that just came out for 2025, Oh, OK.

Wow. 16, 618,000 people are expected to die in 2025 from cancer, which comes to 1,700 people a day or 70 people an hour. And it's getting worse and worse every year.

It's even now entering into the younger ages. Young children and younger adults are getting cancer at astonishing numbers. And this will continue and will get worse and worse as long as the field thinks it's a genetic disease.

As long as the National Institutes of Health on their website say cancer is a genetic disease, we can expect a lot of dead people, a lot of poor souls that are dying as a result of this failure to understand the biology and biochemistry of this disorder.

So until the field recognizes that this is a mitochondrial metabolic disorder, we are not going to see any dramatic drop in deaths.

Mitochondrial Dysfunction and Fermentation in Cancer

And what I just said in that short blurb represents 100 years of scientific evaluation and dozens and dozens of scientific papers supporting everything that just came out of my mouth.

And you know, I think I could just thank you for joining us today. And that was a really great show because I think you literally just kind of rolled through my entire outline in that initial.

Yeah, well, you know, you know, but that's the long and the short of it. I can do a deep dive on the biochemistry if you'd like. But I but sometimes people, you know, get glassy eyed on that.

Yeah, and I did. You just touched on something that has really hit a nerve in my community and in my life is the fact that we're seeing people younger and younger getting these cancers in 20s and 30s where we used to not see that.

And I wanted to kind of talk to you, because I heard an amazing interview that you did that kind of talks about, number one, this doesn't happen overnight to the mitochondria.

The mitochondria don't break overnight. It takes a long period of time to do this. But what breaks these mitochondria? Well, it's not what breaks them.

It's what disrupts their ability to generate energy using oxygen. So let me give you an example. And you're right. It's a chronic. It's a chronic disruption of energy metabolism in in the mitochondria of a particular cell in a particular organ So what we have what we have found is that all major cancers all of them all major cancer about 98% of them have the same problem They all have, if you look under the electron microscope, you see that these organelles called the mitochondria, which is kind of like a spaghetti network inside the cell.

Yeah, this is a little cross section. That's not what they really look like in the living cell. They're like a spaghetti network all through the cytoplasm.

They fuse together, they fission, they separate. It's like a second living organism inside the cell. which is the way they originated. But you see those nice folds in there?

Yes. You have the cristae. They're called cristae. Yeah. They are all oftentimes broken, missing. We get ghost mitochondria. So they just look like vacuoles.

So those cristae contain the lipids and the proteins responsible for us generating energy through oxygen. So oxygen enters into these organelles and pulls electrons forming water.

And in the matrix there, the spaces is the TCA cycle, tricarboxylic acid cycle, Kreb cycle. You can call it different things. But they break down the foods that we eat.

and get energy and the waste product of that is CO2, carbon dioxide. The waste products of normal respiration like you and I are doing right now, you and I are breathing, Every time I take in oxygen, I exhale CO2.

And water is being produced in these mitochondria that eventually becomes attached to amino acids and proteins. And things becomes urine. And we expel.

So we excrete the waste products of respiration in the form of CO2 and water. And of course, with urea, it combines with other things. But in the cancer cell, Chronic disruption of that organelle causes a shift away from energy through oxygen, and you start to get energy produced with a mechanism that doesn't involve oxygen.

It's called fermentation. and the exact biochemical process is called substrate level phosphorylation as opposed to oxidative phosphorylation. With oxygen.

Yeah, with oxygen. Because cancer cells can live, everybody knows they grow in hypoxia, which is without oxygen. The other thing too, and we and Warburg and others, they can grow in the presence of cyanide.

um now we know uh the old statement you know he drank the kool-aid the cool well that that came from greenstown uh yeah where they put cyanide in the kool-aid and they all drank the kool-aid and they all died very quickly uh cyanide binds to uh the protein that warburg discovered this the cytochrome c protein that warburg shuts down oxidative phosphorylation completely and you're dead okay all right but cancer cells can live in in cyanide and they can live without oxygen so clearly they're getting energy from a non-oxidative source so i heard real quick i i just heard you say that on a show there was a did warburg do the experiment where he killed the mice who had cancer he killed them with cyanide the mice died but the cancer cells the tumors lived Oh, yeah.

Well, not only I think Warburg, but there was other guys who did the same thing. So it was a Japanese group that did that as well. Wow. Yeah. And we did it.

We did it here. Not killing the mice with the tumors in them, but looking at the tumors under different conditions. A lot of people have done this. People know this.

But Warburg said once that mitochondria becomes damaged and oxidative phosphorylation becomes insufficient,

it's irreversible. He said it was irreversible.

OK. OK. And we also think the same. There's a threshold at which you might be able to rescue some mitochondria that are on that downslide to switch to fermentation.

You might be able to rescue them. But once that structure of that organelle is compromised, usually the best way to deal with it is to kill the cell that has that.

And that's why the way you kill the cancer cell is you take away the two fuels that that are replacing oxygen, the fermentable fuels. So they can't live with that without those two fuels.

People say, oh, but they can use other things. Well, they can't use fatty acids or ketone bodies. We tested that. Others have tested that. We know that.

You need a good healthy mitochondria to burn ketone bodies and fatty acids. And as I just said, the mitochondria of cancer cells are all corrupted. We published big papers on that.

Others have published papers on that. So the cell now becomes vulnerable to elimination by simply restricting the fuels driving the fermentation metabolism.

But you have to realize, how did this all happen? And we know from evolutionary biology that life evolved in an environment without oxygen called the alpha period of life on Earth.

So we had these microorganisms that were alive and growing. in an atmosphere with no oxygen. And they were using these fermentation pathways, these pathways to generate energy without oxygen.

And then when oxygen started to become available in the atmosphere by these various bacteria producing oxygen, There was this fusion event when one organism fused with another.

These are single cell organisms. And that was the origin of the mitochondria back then. And those cells were able to use oxygen to generate energy. And they fused with the other cells that were predominantly fermenters.

And then you had this beautiful synergy, which people think only happened once in the origin of life on Earth. And then all life started. complicated life, metazoans, multicellular organisms, came from this original fusion event.

And then over millions of years of evolution, we start to develop more and more sophistication in what these microorganisms, eukaryotes, can do that becomes division of labor.

Because once you have efficient energy, there's a lot more things you can do than if you have inefficient energy. So what happens in cancer is that people are exposed to a lot of different environmental toxins or lifestyles that will cause chronic damage to a particular mitochondrion in a particular cell in a particular organ.

For example, in breast cancer, you might have an occluded milk duct leading to an inflammatory foci in part of the breast. which chronically would disrupt oxidative phosphorylation in a cell in that focus, leading to a gradual transition to a fermentation metabolism.

It doesn't happen overnight. And once that transition happens, from respiration to fermentation, which is basically a replacement of oxygenation with fermentation, and that's what Werberg said, cancers start when oxidative phosphorylation is compensated by fermentation, compensatory fermentation.

Now, the issue, of course, well, how does that lead to dysregulated cell growth, which is what cancer is? And I'm talking about cancer in any tissue, any major cancer.

We all start with a chronic disruption of oxidative phosphorylation that could be started by systemic inflammation, intermittent hypoxia, various oncogenic viruses, as I said, chronic inflammation in the body, radiation.

Even rare inherited mutations damage these mitochondria. So we've been able to link all known causes of cancer into a common pathophysiological mechanism which involves the replacement of oxidative phosphorylation with substrate level phosphorylation, which is fermentation.

Now, why is that so important? Because you have to realize those cells that existed on our planet before oxygen came into the environment, they were all fermenting, they all had unbridled proliferation, dysregulated growth, And they would die only when the fermentable fuels in the environment at that time would be dissipated and these cells would die.

So there was no regulation of growth. The growth came as long as fermentable fuels were in the environment. So the cancer cell is doing nothing more than falling back on these ancient pathways.

And it is the mitochondria that determines the differentiated quiescent state of cells in our body. So if we need to replace cells, they divide. But the division to replace a dead cell is well regulated.

It's regulated by the activity of the mitochondria itself. So the mitochondrion controls the cell cycle through calcium signaling, which we know calcium is a very powerful signaling molecule.

But it's also regulated by the energy efficiency of the mitochondrion. So as the mitochondria becomes less and less functional and starts to gravitate towards fermentation, it loses the capability to maintain the stable differentiated state.

And the cell now starts to divide in an uncontrolled manner and will continue to do that as long as glucose and glutamine are available in the microenvironment.

And our bodies make huge amounts of glutamine because it's essential for our gut and our immune system. Our immune system needs glutamine to fight bacteria and repair tissues and all this kind of stuff.

So glutamine is always there in great abundance, far more than any cancer cell would need. The availability of glutamine is always there. That's why you need drugs to target the glutamine.

You can't do it by diet. But the glucose can be managed by diet. So diet can manage the glucose part of the equation, where drugs will manage the glutamine part of the equation.

Now, let me just give you another example, which is quite eye-opening. The waste products that we see coming out of cancer cells, like as I said, waste products of respiration are CO2 and water.

The cancer cells, the waste products are lactic acid and succinic acid. These are the two organic waste products. You should never be wasting precious carbon-hydrogen bonds.

CO2 and water no longer possess energy. Whereas lactic acid and succinic acid contain carbon-hydrogen bonds, which embody the energy of the sun.

Nuclear Transfer Experiments and the Role of Cytoplasm

The energy of the sun creates carbon-hydrogen bonds. So when we break down carbon-hydrogen bonds, we're essentially releasing back the energy of the sun to drive our metabolism.

We get the energy back from the sun in a sophisticated, organized procedure in the mitochondria. So cancer cells are dumping out large amounts of succinic acid and lactic acid into the microenvironment, telling us that they're fermenting.

Those are the waste products of glucose fermentation in the cytoplasm and glutamine fermentation in the mitochondria. Our big discovery was that the mitochondria can ferment glutamine and the waste product is succinic acid.

They're doing that even in the presence of oxygen. That was what Werberg said. They ferment in the presence of oxygen. This should not happen. So let's look at another example that all of us can really appreciate a heart attack.

OK, yes. Somebody has a cardiovascular arrest or what do you want to call a heart attack? They stop breathing because the heart no longer is the heart is no longer pumping oxygen into the bloodstream.

So when that person's heart ceases temporarily, You don't die instantly like the cyanide poisoning, which is a permanent shutdown of oxidative phosphorylation.

The body immediately becomes hypoxic. You're turning purple. But immediately, the majority of cells in our body switch on fermentation. Very rapidly to keep the cells alive and we can and the body can do that for a short period of time like over Otherwise, you don't get that heart beating quick You're gonna be dead and you die because the brain essentially the neurons of the brain die.

They're very very oxygen Sensitive dependent. Yeah, but when you look at the bloodstream of a person who has a heart attack and You get large amounts of lactic acid and succinic acid building up in the bloodstream, waste products of glucose and glutamine fermentation.

So the heart, all the different cells in our body use those same two fuels because the waste products are there. The issue, of course, is when you get the heart to beat again and the person starts breathing again, the lactic acid and the succinic acid immediately disappear from the bloodstream because you're breathing.

You don't need to ferment. the cancer cell ferments is locked in. It's locked into the fermentation because its mitochondria are irreparably dysfunctional.

So now we know. We know precisely what's going on with this whole process. And we know the cancer cells are continually throwing out lactic acid and succinic acid in the presence of oxygen, which could only happen if the mitochondria are dysfunctional.

And oxidative phosphorylation is institutions for driving right so now how are we going to how can we fix cancer well you can put uh like putting a new engine in your car you can put new mitochondria in the cell and that's been done in vitro and you can stop cancer that way but that's not what happens in the body we're not there yet Can I ask you about that?

Because that's one of the things I've been, one of the most interesting experiments I think people would be interested in is there were experiments where they took the nucleus of a cancer cell and put it in a healthy cell to see if that healthy cell would get cancer and that nucleus from a healthy cell into a cancer cell to see if it would make it healthy.

And then they also did that with mitochondria. Can you go through that? Yeah, I summarize those experiments for the first time. They've always been in the literature, but no one linked them all together to challenge the somatic mutation theory of cancer.

Israel and Schaeffer from the University of Vermont did those beautiful experiments that you just mentioned. But they were also done in frogs and mice and different experimental systems which provides the strongest evidence that cancer cannot be a genetic disease.

You're absolutely right. So what was found is that you have a tumor cell that grows. And how do you know? Well, you put it under the skin of, in those experiments, they were rats, not mice, and you got a tumor.

So the investigators went back and thought maybe the cell that they derived those cells from maybe was tumor, but then they took the original clone and put it under the skin of a rat.

It didn't form tumor. So clearly something happened over many generations in the culture dish to make this cell turn into a tumor cell. So to test that, they took the nucleus out of the tumor cell and put it into the cytoplasm.

They removed the normal nucleus of the normal cell and put the nucleus of the tumor cell into that cytoplasm and put that under the skin of the rat. And they got no tumors, just, I think, one out of 76. On the other hand, when they took the nucleus of the normal cell, they took the nucleus of the tumor cell out and put the normal nucleus in there and then put that under the skin of the rat.

they get 98% tumors from that. Which clearly says that it's the cytoplasm that's calling the shots on whether the cells are regulated or dysregulated.

And McKinnell, who I talked to with the frogs, he did the same thing. He took the nucleus out of a raging tumor in the kidney and put that tumor nucleus into a fertilized frog egg where the normal nucleus was removed.

And he developed a clear tadpole, completely normal, from the nucleus of a malignant kidney tumor. And I asked him about that when he was alive. He was the curator of the medical library at the University of Minnesota in Minneapolis.

And he told me, he said, I even cut the tails off these tadpoles, and they grew a perfectly normal tail, all regulated in growth, from the nucleus of a kidney tumor.

So clearly, the regulation of cell growth was not coming from the nuclei. It was coming from the cytoplasm. And then if you damage the mitochondria in the cytoplasm, you no longer get regulated growth.

You get dysregulated growth. So clearly, it all points back to the mitochondria within the cytoplasm. Are calling the shots on whether or not we get cancer.

So if you want to prevent cancer, you have to keep your mitochondria healthy. very, very hard to get cancer if your mitochondria are healthy. So what we in our new society of the present day society where we are bombarded by lack of exercise, poorly processed, highly carbohydrate foods, stress, poor sleep, all of these things impact negatively on the structure and function of the mitochondria in a particular cell of a particular organ and voila, you got cancer.

Uh, where did it come from? Well, we're now saturated with micro plastics forever chemicals No exercise poorly processed carbide. None of this stuff ever existed in our in our ancestral past So we clearly know what is What is provocative to the origin of cancer?

We know the mechanism by which it happens. We know now how to manage this because they can't grow without fermentable fuels. So we can target that while transitioning to fuels that the tumor cells can't use because they can't burn fatty acids or ketones because they're under effective.

So the solution to both prevention and management is here. We have it. We know what to do. The question is, who wants to do this? Right. Right. Absolutely.

That's the big challenge. And when you bring it up to people at the top cancer centers, whether it's down here at Dana-Farber that we have in Boston, MD Anderson, you hear about Sloan Kettering, the Moffat, the Fred Hutch.

You can go around the country, the James. Most of the oncologists never heard that glucose drives cancer. So you go to the cafeteria and see people being infused with chemo, drinking a big Coca-Cola.

I mean, what could be more absurd than doing something like this? But that tells you that this, what I've just explained to you, has never been heard or understand it.

It's like people say, well, you know all this stuff, how come nobody's doing it? Why don't you go down and ask the guys at Dana Pharma, do you know what I just said?

They said, no, I never heard about this. And the other thing they would say is, if it were really important, I would have heard about it in medical school.

You're not hearing about it in medical school. What you're hearing is that cancer is a genetic disease in medical school. So that perpetuates the death, suffering of patients.

So we can put the whole thing together. We know exactly what's happening. We don't have to do it all. The problem is that they're not enthusiastic to do this either, because they can't figure out how to generate revenue on what we're talking about.

And always remember, remember and never forget, revenue generation first, patient outcomes second. That's the way it works. That's the system. That's the industry.

So until somebody can figure out how to make a big buck on what we're talking about, we got 1,700 people a day dying from this disease. Just that simple.

Yeah. Well, you know, and I think that's why it's important to have shows like this and to have a mechanism to get this information to the people directly, right?

Ketogenic Therapy, GKI, and Practical Cancer Management

Because I know that there are many, many, many people who would love to understand if there's something they can they can do personally to try to prevent cancer, and when they get it, there are people who are desperate to do anything they can do to try to beat it.

I can tell you that ketogenic metabolic therapy is a powerful arm for the new paradigm. We don't throw out radiation and chemo because they also have a part, even the immunotherapies do, But we would not use them as upfront strategies for managing cancer.

The best way to do this, we think, is that we would want to shrink down the tumor at the beginning, make it indolent, less angry, less inflamed. And then if we can't get rid of it completely with metabolic therapy, we would then come in with strategic drug and radiation targeting and things like this.

Even surgery will be more effective if the borders of the tumor are more circumscribed and defiable. The surgeons feel better that they get it all out rather than a part of it.

Because when they don't get it all out, it can come back at you. And you want to make sure you you you get rid of this thing as best as possible. So upfront metabolic therapy Shrinking it down making the rest of the body healthy and then coming in using some of our drugs Toxic as they are but you can use them in very low doses now, right?

They become far less toxic and more therapeutic. That's actually beautiful and But they're not doing any of that. This is not what we call the part of the standard of care.

And I know a lot of physicians that would love to do what I just mentioned, but they fear losing their license for not following the rigidity of the standard of care.

So why was the standard of care written in granite? It should be flexible. When something new comes along that can be of great value to the health and well-being of people, you should be able to integrate that into your standard practices to improve the overall outcome.

And this is not being done. So people need to know that. I feel bad because a lot of people email me and they say, oh, listen, you say all this stuff, And then when I go down to my oncologist, they slap me down.

They say, never heard of it. If this can't be true, because they would have heard. Well, there's a transition in knowledge here. We have to become scientifically literate and know about this.

And the patient and the oncologist should work together as a team. Because the success of metabolic therapy for cancer management depends on the knowledge of both the physician and the patient, because now the patient is

predominantly in charge of their destiny.

They're the ones that have to get their blood sugar down. They're the ones that have to get their ketones up. That's why we developed the glucose ketone index calculator, the GKI, to allow every person who has a chronic disease, especially cancer, to get their blood sugar down and their ketones up, putting that tumor in a state of metabolic vulnerability.

And now they work with the oncologist to polish off and slowly degrade the tumor. So we have the tools. We have the know-how. We have the strategies. We're just not implementing any of this yet.

Yet. Right. And that's what we're hopeful for. I actually just heard that in another show in the past couple days I was listening to that you were instrumental in developing GKI.

Yeah, we published that. I published it based on a wonderful woman. an American who was living in Nice, France. And she had a brainstem tumor, diffuse intrinsic pontine glioma, which is pretty deadly.

And it was right after I wrote my book that this person reached out to me and said, let's do metabolic therapy. She didn't want any radiation or chemo or anything.

So she lasted about eight and a half years. But that was even before we started targeting the glutamine. We really didn't know too much about the glutamine targeting at that time.

But what was happening was she was measuring her blood sugar and measuring ketones independently of each other. And she got into a fight over a parking spot.

She had a handicapped parking spot. And she went up and measured her blood sugar. And it was through the roof. uh very high like like I think it was uh 160 milligram per deciliter was very high like a diabetic or something right right she emailed me and she said oh my god my my blood sugar is so high my tumor is going to grow fast i said what's your ketones and she said oh no they're about two millimolar didn't go they didn't go down they stayed high so i said to my students i said no that we've got to come up with a new way to take the anxiety out of these measurements so we divide we divide we divided the blood sugar By the value of the key we transition sugar and ketones to millimolar and then we can divide glucose by ketone and then and then you don't get such a big spike because the ketones are you're dividing that blood sugar by the ketone So then the anxiety of these things goes way down and we realized also that anxiety makes blood sugar go high because of your glucocorticoid levels So lowering glucocorticoid levels, increasing exercise, which is an extremely important part of managing cancer, all reducing stress.

When you exercise your muscles, your muscles are pulling sugar out of the bloodstream. Yes. Lower anxiety lowers blood sugar. You get your whole body into a new metabolic state and then you come in strategically and target that glutamine pathway and you're going to be hammering the hell out of these tumors while your body is getting healthier and healthier.

No ball this year. All this crazy stuff that we're doing, mucositis and diarrhea and microbiome, all this crazy stuff. I mean, this is the result of a medieval therapy conducted by people who lack knowledge.

I mean, it's just that simple. I love that concept too that you just talked about. When you use metabolic or ketogenic therapy, when you put the body in that state, the rest of the healthy cells are actually getting healthier.

They're getting everything they need and that they can use and they're getting healthier while the tumor cells are getting weaker and weaker because they're starving.

Yes, and not only that, if you keep doing this like we did with the dog, we had a dog that was probably the only thing we truly knew we cured. I saw that.

The body will turn on the tumor for food. It's called autolytic cannibalism. When you have restricted the fuels to the

body, the body has a remarkable healing machine.

It surveillances all cells and tissues in the body to make sure that every cell, every organ is operational at maximal efficiency because the food sources are limited.

So the body has to be remarkably efficient. Efficiency comes from oxidative phosphorylation. So if you have a group of cells in a tissue that is not carrying the weight of efficiency, the body will actually dissolve that tissue and use the fuels of those cells to feed the good cells.

Wow. So so autolytic cannibal, I have it in my book. So so again, we have to allow the body to heal itself. And we have to know how to do that. And metabolic ketogenic metabolic therapy is the strategy that allows us to manage cancer and not only cancer, all these chronic diseases as well.

That's kind of the link, right? We're talking about heart disease and diabetes, Alzheimer's and dementia. All of these diseases now, we're finding the link to chronic carbohydrate over consumption, insulin resistance and hyperinsulinemia, creating that environment for these things to thrive.

And we have linked all of the chronic diseases to mitochondrial dysfunction in one way or another. So in the case of heart tissue, there's some tissues in our body that don't form cancer.

Cardiac myocytes do not form cancer because they cannot switch to fermentation. They have such a demand for energy through oxidative phosphorylation, they can't transition.

So you can never get, or rarely if ever get, cancer from cardiac myocytes or neurons in the brain. Neurons in the brain cannot switch to a fermentation metabolism.

Therefore, neurons die. That's why in Parkinson's disease and Alzheimer's disease and these things, you don't get cancer. You get dead neurons. You get dead cells.

But it's ultimately linked to the mitochondria. It's a mitochondrial dysfunction. but without the compensatory fermentation. In cells that can compensate oxfas with fermentation, that puts those cells at risk for dysregulated cell growth, which is cancer, whereas other cells just up and die.

But everything ultimately comes back to the health and vitality of the mitochondria in the body. And they also determine how long we're going to live.

We're all destined to die. We have a finite amount of life for each species. You can retard or expand that. But it's when our mitochondria systemically run out of energy, we die.

We die from the second law of thermodynamics, which is disorder. And all mitochondria, when you die, you can look at a person like even the queen. She looked very healthy, shaking hands with the new prime minister one day and dead the next day, the queen of England.

So it appears that the mitochondria can just shut off when they reach a point where they can no longer maintain energy balance. But we chronically damage our bodies so we can have all these different readouts of this thing.

But bottom line, you keep your mitochondria healthy, and you have a chance to live longer with a healthier life. But of course, our diets and lifestyles wear and tear on our mitochondria, shorten our life.

Some people, you can't live to be 150. At this time, we have not figured out how to keep our mitochondria healthier. You know, there's other groups out there.

There's Petro's paradox. They say, oh, elephants have all these things. You know, elephants, oh, they live long. But what do they eat? They're eating their natural diet, right?

Why don't we give elephants pizzas every day and Dunkin' Donuts, glazed donuts, as much as they possibly can eat. Let's see how long these damn elephants live.

I had a friend who, the polar bear at the Brookfield Zoo in Chicago, I think that's what it was, died from pancreatic cancer from kids throwing the candy to the polar bear all the time.

So he did a pathology before the bear died from pancreatitis and pancreatic problems. So clearly polar bears did not evolve to eat Snickers bars. But they love Snicker bar.

I mean, you can give the polar bear will just gobble these Snicker bars down. But if you give it to him every day for years, he dies from the same stuff we die from.

It will ruin their health as well, right? Well, like you said. And dogs. Domestic cancer is the number one killer of domestic dogs. And dogs are eating the same crap we're eating.

They're highly processed carbohydrates, not appropriate for their evolutionary biology. I mean, there's no mystery here. So we can explain most aspects of chronic diseases with a clear understanding of evolutionary biology and biochemistry.

Unfortunately, a lot of people just don't have that knowledge or just were never exposed to it. So once you understand that, then you can develop therapeutic strategies for improving.

And that does not mean that you have to deny yourself the enjoyments of our technological societies. Baked goods and things evolved. We developed those over the years to be tremendously tasty, and we enjoy them.

But a lot of these were developed by natural ingredients. Unfortunately, today we're just loaded with highly processed carbs. And I think a report just came out on obesity.

It's related to how much highly processed carbs people are eating. It's not a genetic death. Some mindless people. Can you imagine saying that obesity is caused by genetics?

I mean, if it weren't, these mindless physicians at some of these universities, I can't understand. They go through medical school. You don't learn anything.

But if it weren't for our ability to store fat, you and I would never, we wouldn't have this conversation. We would have been extinct. So we're perfect.

Humans are magnificently geared to store energy. So when you have large amounts of highly processed carbs coming into your body, you're storing it as energy thinking that it could be a famine coming.

Because we evolved in feast famine environments. And now we're always in a feast environment. And we're paying unanticipated consequence of our development of grains and rices is dementia, diabetes, cancer, cardiovascular disease, autism, not autism.

Prevention, Lifestyle, and the Future of Metabolic Medicine

Some of these other neuropsychiatric problems are all the result of mitochondrial dysfunction in a new environment that we did not evolve in. Absolutely.

And again, I think we look to evolutionary biology, right? And we're looking at Hunters and gatherers didn't have all of this stuff. They primarily lived a ketogenic lifestyle.

And they got access to fruit when it was time to fatten up for winter, right, to make it through. And that was the B-spamming cycle that you talk about.

Yeah. And all of our, most of our, not all, of course, many organisms lived in this kind of an environment. Even the orangutan, we found some data on looking at ketones in the orangutan.

And they had very low ketosis during the fruiting, when the fruits were all ripe. And when the fruits were gone, they were back in ketosis again. So clearly, that kind of parallels, I think, what our ancestors, during the Paleolithic period.

Because the Neolithic period is when we started to cultivate grains. And then what do we get? We get civilization developing around a constant food source.

rather than being a hunter-gatherer kind. But some of my colleagues in Hungary treat cancer using paleolithic diets. Essentially, it's very low carbohydrate diets, high in protein and fat, and that lowers your GKI, and that's directly linked to how fast your tumor grows or whether or not you get cancer in the first place.

So you keep a low GKI, and it prevents cancer. And if you have cancer, you take a low GKI and come in with targeting, glutamine targeting drugs with exercise.

So all of these things are patterned. We can do all this. We just have to, people just need to know what to do. We just published a monster paper in Biomedical Central BMC Medicine.

which outlines a therapeutic strategy for managing brain cancer, glioblastoma. And we had about 30 authors on this, physicians and nutritionists and space scientists.

And it really spells out very clearly by my colleague, Dr. Thomas Durai, who was the first author of the paper. A clear strategy for managing this brain cancer.

But as I said, all these cancers have the same problem. So you could use it for lung cancer, colon, breast, It's clearly spelled out. A strategy, a clear what to do and how to do strategy for treating cancer is already available.

But it's not adapted. It's not part of standards of care. Yet. Yet. It will be. It will be the standard of care once people realize that this is, if you want to stay alive.

But if you want to live a life We can't predict how long you will live. We don't know if this will, because we never used the term cure. Cure is an arrogant term.

We can't promise anyone cure, nor can they promise a cure from any conventional standard. People say you've lived five years and you didn't have a recurrence, and then five and a half years you get a recurrence.

Were you cured? I don't know. So the best thing is we can do is we want successful management. Whether that turns out to be a cure or not, we don't know.

But I consider, in my view, successful management is success. If you're living far longer than you were predicted to live with a good quality of life, I consider that success.

And so should the patient. And that's what we strive for. We strive for continuing to improve overall survival. Progression-free survival is what the Food and Drug Administration uses to award new drugs.

And it's very interesting because some of these drugs, they look like they had a tremendous effect on the tumor. but progression-free, which looks like, oh my god, this tumor's shrunken.

But you only live two or three months longer. It's not improving your overall survival. It's only a short-term appearance of a fix. And they approve drugs based on that.

They should eliminate that. Drugs should be approved on overall survival, not progression-free survival. Or you can do both. But overall survival should be the most important criteria for determining whether or not something is

working.

So we constantly approve drug after drug after drug, and all we get is more and more dead cancer patients. So something is missing here. So what's going on?

Our approval mechanism is flawed. We're not using the appropriate mechanism. When we do our preclinical studies, our preclinical mouse work, we look for overall survival.

How long can these animals live with a raging malignant tumor? How effective are we in managing that tumor? These mice always have the tumor. We have not cured a mouse with cancer, a natural form of cancer, yet.

But we can keep them alive many, many months longer than they would have lived. But we have not cured. People say, oh, you cure a mouse. Yeah, you cure genetically engineered things that are not representative of the real world.

You take a real world metastatic cancer in the mouse, you try to cure it in a mouse, in a natural mouse. It's very, very hard, just like it is in the human.

That's why we learned to do targeting glucose and glutamine. We learned all that from our preclinical studies. And then we then translate that right into the clinic.

And when people try to do this now, you're getting really, really remarkable results on those individuals that no understand. We see the best results are those cancer patients that understand what cancer is.

And they know that their actions will be largely responsible for their success. This is very different. Then if you go to the oncology and you just sit there like some mannequin and they just Bombard you with all these toxins and you're really not doing anything there.

We so he's battling case not battling cancer He's just sitting there being brutalized by a system when you do metabolic therapy. You are in fact battling cancer That's a big, big difference here.

So people want to battle cancer, they do ketogenic metabolic therapy and parts of the standard of care that will be synergistic with ketogenic. And the outcomes will be far greater.

Absolutely. As we wrap this up, what are the best resources you recommend for people who want to do their own personal investigation and deep dive? Let's say they're diagnosed fresh, they want to find out as much information as they can.

Well, all of what I've mentioned is all open access. What I mean by that is you just have to look my name up and what is he publishing, and you get all of these papers.

A lot of them are heavy. I don't want to say that this is pleasurable, easy reading, Sunday afternoon reading. You'd really have to sit down with someone, maybe, and go over it in detail and spend some time.

I give a kit of information. All we ask is that if you survive and you do well, donate to our foundation, Travis Christopherson's Foundation for Cancer Metabolic Things.

They support our research. All of the work that we're doing is supported by philanthropy and private foundations. There are people who want to be part of the paradigm shift.

There are people out there who like to be a part of this who don't care whether they can make a lot of money on it They just want to say I was part of this new transformation and we're the ones doing that so The more we I write human case reports as well for people that are using this so I publish those There they take a lot of time and energy to do that But most of the funds that we get support my research staff of scientists and physicians and students here at Boston College.

So we train young people. They're getting very excited about this. Yeah, and people are coming back to us with stories of success. People I think are dead.

I hear a guy, he comes back and he says, I haven't heard from this guy for two years. I figured he must be dead. He comes back and he says, oh no, I'm doing really well.

I'm still alive. I'm saying to myself, oh wow, that's really great news. And we're trying to catalog these people now, get a registry of how many are survivors, long-term people.

Oh, they gave me three months to live. Oh, he told me I'd be dead in a year. And here he is like five years later. Now, some of them still have their cancer.

It's just they're living with it. And they've learned to realize that some of them can watch it grow when they eat sugar and watch it decline when they stop eating sugar.

Oh, dear Lord. Oh, my God. Oh, yeah. I've spoken to people who've actually watched it grow. It's all related to the level of blood sugar. So right. Right.

Right. And you do exercise. So there's a lot of strategies that we can use to manage this cancer. But we're working out the mechanisms. So you see the scientific community, the real heavy guys, they got to see mechanisms.

They want to see mechanisms of action. They want to see, well, we're doing that. We have to do that to validate what we're doing. But at the same time, we're managing the disease and at the same time ferreting out the mechanisms by which, what explains the results that you're getting.

So it's a two prong. You've got the clinical on one side and the basic research on the other side. Right, absolutely. And your book, Cancer as a Metabolic Disease, that's not an easy reader.

I saw that on Amazon. It's about 100, 110 bucks. But if this is going to change my chance. Yeah, well, this is John Wiley. They're a professional textbook.

They're a scientific book publishing company. They don't publish these 1990. And I wrote only one book. I didn't write all these reviews or these summaries and all that.

Other people are taking my YouTube videos It's distilling down what I'm saying Writing books with my name on it saying I wrote this and I didn't do that.

So And that's just what happens in this kind of world But yeah, my book is we've got so much new information added on to the platform that supports almost everything that I wrote about in 2012. We even have stronger evidence now to support that stuff.

So we're on the right path. There's no question about it. And the society will come to know because it works. Yeah, right bottom line it works. It doesn't hurt you and and if you can manage your cancer Effectively we take the fear of God out of this whole thing, you know So many people they get diagnosed with cancer and they have them They think that the angel of death is looking over their shoulder that they're gonna make a date with the grim reaper You know, we're putting the green reaper out of business here.

So That you have power within your body as long as you know what to do and how to do it You have the opportunity to manage this disorder more effectively, which builds up your confidence and reduces anxiety.

So people get fear-stricken. They get into a depression. Everybody doesn't want to talk to them. They think this is absurd. Um, and a lot of families all gather together and they all go on metabolic therapy together.

They all get super they all get healthy together. They all get healthy together. They all live better lives. Yes, absolutely. So it's just the word has to get out.

That's all we're just we're just not the word is not out yet completely Well, we are certainly going to do our best to get this word out. Again, thank you so much for the time that you spent with us, Doc.

I really appreciate you. We are going to go ahead. We're going to have links to how they can donate to the cause in our show notes for you and where they might be able to get resources as well.

That'd be great. Thank you very much. Thank you, sir. I'm going to send you backstage real quick and I'm going to land the airplane. I'll be right back.

Ladies and gentlemen, that was quite a ride on this episode of the show, as I knew it would. A very deep dive, and we're probably going to have more episodes so that we can tease out some of this amazing information that Dr.

Seyfried shared with us. So as always, keep striving, keep reaching for your life possible. That's a wrap for this episode of the Life Possible podcast, where we unlock the power of metabolic health to fuel your best life.

If you found value in today's conversation, don't forget to like, subscribe, and download the podcast so you never miss an episode. And if this message resonated with you, share it to someone who needs to hear it.

Let's spread the power of life possible together. For more inspiration, insights, and exclusive content, be sure to follow us on Facebook, Instagram, and LinkedIn.

Thanks for tuning in. Keep striving, keep thriving, and remember your best life is within reach.